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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/580,155	Applicant(s) PELLENC, ROGER	
	Examiner JUE ZHANG	Art Unit 2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/22/2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 84-143 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 127-134 is/are allowed.
- 6) ☒ Claim(s) 84-126, 135-143 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office action is in answer to the responses filed on 11/22/2010. Claims 84-143 are pending, of which claims 84, 127, 130, 132 are amended by the current amendment.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1,148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 84-85, 88-89, 94-97, 101-111, 118-126, and 139-143 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koga (US Patent No. 6268710, hereinafter '710) in view of Sakakibara (US Patent No. 6433517, hereinafter '517), further in view of Iwaizono (US Patent No. 6577105, hereinafter '105).

Claim 84, '710 teaches a power autonomous portable electric tool set (Fig. 1-23), comprising:

a first sub-unit (e.g., 10, see Fig. 1);

a portable second sub-unit (e.g., 1)(Fig. 1) forming an electric energy source of the set comprising a battery (e.g., the battery cells, see Fig. 1) and at least one electric or electronic module (e.g., 2-9, see Fig. 1) located in a vicinity of the battery for at least one of controlling and managing the battery (e.g., see Fig. 1);

a third charger sub-unit (e.g., 11)(Fig. 1) for electrically recharging the battery comprising at least one electric supply source, wherein the third charger sub-unit adapts a voltage and a current of the at least one electric supply source to recharge the battery (Fig. 4, 6, 7 and corresponding text); and

a cutoff device (e.g., SW1, SW2, see Fig. 1) structured and arranged to cutoff an electric supply of the first sub-unit (e.g., the current from the battery to load being cutoff when SW1, SW2 is off, see Fig. 1),

wherein the first sub-unit is electrically disconnectably connectable to the second sub-unit, and wherein the third sub-unit is electrically disconnectably connectable to the second sub-unit (e.g., see Fig. 1).

wherein the battery comprises one of a rechargeable electrochemical lithium-ion or rechargeable electrochemical lithium polymer battery (e.g., see col. 1, lines 10-19),

wherein at least one of the at least one electric or electronic module and the cutoff device are operable to prevent overcharging of the battery during a charging phase (e.g., see Fig. 8), and wherein the at least one of the at least one electric or electronic module and the cutoff device are operable to prevent over-discharging of the battery during operation of the tool (e.g., S34, see Fig. 9).

'710 does not explicitly disclose a first sub-unit is tool comprising an electric actuator (e.g., the motor, Fig. 1, 2, 4) for generating a mechanical operation;

'517 discloses a first sub-unit generating a mechanical operation of a tool powered by reachable battery comprising an electric actuator (e.g., see col. 4, lines 25-36, Fig. 3);

Therefore, the subject as whole would have been obvious to one of ordinary skill in art at the time of invention to have modified the power tool system of '710 to include the tool as the first sub-unit, as disclosed in '517, since it does not require a power cord to supply its power.

'710 and '517 teach the claimed invention except for explicitly disclosing that

- wherein the at least one of the at least one electric or electronic module and the cutoff device are operable to protect the battery against excess current during a discharging phase, and
- wherein the at least one of the at least one electric or electronic module and the cutoff device are operable to interrupt the discharging phase to turn off the tool, when at least one cell of the battery reaches a threshold minimum voltage recommended by a manufacturer of the battery (e.g., see col. Col. 9, lines 16-20).

'105 discloses a protection circuit for protecting secondary battery from over-discharging comprising:

- wherein an at least one of the at least one electric or electronic module (e.g., 1, Fig. 1) and the cutoff device (e.g., 11, 12) are operable to protect the

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battery against excess current during a discharging phase (e.g., see col. 10, lines 4-31; Fig. 1), and

- wherein the at least one of the at least one electric or electronic module and the cutoff device are operable to interrupt the discharging phase to turn off the tool, when at least one cell of the battery (e.g., see S31, Fig. 9) reaches a threshold minimum voltage (e.g., the predetermined voltage corresponding to an excessive large discharging current, see col. 10, lines 17-31; Fig. 1).

Therefore, the subject as whole would have been obvious to one of ordinary skill in art at the time of invention to have modified the power tool system of '710 and '517 to include the over-discharging protection circuit as disclosed in '105, since it protects the battery cell from damage caused by over-discharging the battery to the load (e.g., see col. 10, lines 4-31; Fig. 1).

'710, '517, and '105 teach the claimed invention as discussed above except for exclusively disclosing that the threshold minimum voltage being recommended by a manufacturer of the battery .

However, it would have been obvious to one of ordinary in art at the time of invention have used the threshold minimum voltage being recommended by a manufacturer of the battery since the manufacturer of the battery have the best knowledge of the perimeters of the maximum discharging current for discharging their battery.

Claim 85, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein the battery is formed by an association of a series of cells, each

cell comprising one of one element and a plurality of associated parallel elements (e.g., see the interconnection of the battery cells in Fig. 1).

Claim 88, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein the cutoff device is structured and arranged to cutoff an electric power supply of the electric actuator at least one of automatically (e.g., see the Sw1, Sw2 in Fig. 1, also see Fig. 8, 9) and manually.

Claim 89, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein the cutoff device is structured and arranged to cutoff an electric power supply of the electric actuator when the battery reaches a voltage threshold harmful to its functioning (e.g., the Over-charging and Over-discharging reference voltage, see Fig. 1, 8, 9).

Claim 94, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein the first sub-unit includes the cutoff device for automatically cutting off an electric supply of the first sub-unit when a battery voltage of the battery has reached a minimum low level (e.g., the over-discharging reference voltage, see Fig. 9) prior to a deterioration, characterized by a significant loss of battery capacity and an increase of battery spontaneous discharge (e.g., see Fig. 9).

'710 does not explicitly disclose that the cutoff device being included in the first sub-unit. However, would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of 710 and 517 to rearrange the cutoff device into the first sub-unit since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70

Claim 95, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein one module of the at least one electric or electronic modules includes the cutoff device to automatically cut off an electric supply of the first sub-unit when a voltage of battery has reached a minimum low level (e.g., the over-discharging reference voltage, see Fig. 9) prior to a deterioration of the battery, characterized by significant loss of battery capacity and increase of battery spontaneous discharge (e.g., see Fig. 9).

Claim 96, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein one module of the at least one electric or electronic modules includes the cutoff device to automatically cut off the electric charge of the battery when a voltage delivered by the third charger sub-unit has reached a maximum value (e.g., the battery voltage higher than the over-charging reference voltage, see Fig. 8) prior to a deterioration of the battery, characterized by significant loss of battery capacity and increase of battery spontaneous discharge (e.g., see Fig. 8).

Claim 97, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein the third charger sub-unit includes the cutoff device to automatically cut off an electric charging of the battery when a voltage of the battery has reached a maximum high level (e.g., the battery voltage higher than the over-charging reference voltage, see Fig. 8) prior to a degradation of the battery. '710 and '517 do not explicitly disclose that the minimum low level above is based on the recommended or required by the manufacturer of the battery. However, it would have been obvious to one of ordinary in art at the time of invention have used the minimum low level

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recommended or required by the manufacturer of the battery since the manufacturer of the battery have the best knowledge of the perimeters for charging their battery.

Therefore, the subject matter as whole would have been obvious to one of ordinary in art to have used the minimum low level recommended or required by the manufacturer of the battery the minimum low level in the battery charging of '517 since the manufacturer of the battery have the best knowledge of the perimeters for charging their battery.

Claim 101, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein, during a period of non-use of the first sub-unit, one module of the at least one electric or electronic modules places the battery in One of a no-consumption mode and a very-low-consumption mode (i.e., when the first sun-unit is not being used, there is no power consumed by the first sub-unit one).

Claim 102, '710, '517, and '105 teach the limitations of claim 101. '710 further teaches that wherein the one module of the at least one electric or electronic modules comprises a switch (e.g., SW1, Fig. 1) arranged at one of the terminals of the battery to place the battery in one of the no-consumption mode and the very- low-consumption mode (i.e., when the first sun-unit is not being used, there is no power consumed by the first sub-unit one).

Claim 103, '710, '517, and '105 teach the limitations of claim 102. '710 further teaches that wherein the one module of the at least one electric or electronic modules further comprises one of a fuse and a circuit breaker (e.g., SW2, Fig. 1) arranged at

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least at one of the terminals of the battery, wherein the switch is arranged after the one of the fuse and the circuit breaker.

Claim 104, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that the third charger sub-unit includes the cutoff device to automatically cut off an electric charging of the battery when a voltage of the battery has reached a maximum high level prior to a degradation of the battery (e.g., see S24 in Fig. 8).

Claim 105, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein the third charger sub-unit includes the cutoff device to automatically cut off an electric charging of the second sub-unit (e.g., see Fig. 8).

'710 or '105 does not the cutoff device to automatically cut off an electric charging of the second sub-unit when a charging current to the battery has reached a minimum low level recommended or required by a manufacturer of the battery.

'517 further disclose the includes the cutoff device to automatically cut off an electric charging of the battery when a charging current for the battery has reached a minimum low level (e.g., see col. Lines 27-55, Fig. 5). '517 does not explicitly disclose that the minimum low level above is based on the recommended or required by the manufacturer of the battery. However, it would have been obvious to one of ordinary in art at the time of invention have used the minimum low level recommended or required by the manufacturer of the battery since the manufacturer of the battery have the best knowledge of the perimeters for charging their battery. Therefore, the subject matter as whole would have been obvious to one of ordinary in art to have used the minimum low level recommended or required by the manufacturer of the battery the minimum low

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level in the battery charging of '517 since the manufacturer of the battery have the best knowledge of the perimeters for charging their battery.

Claim 106, '710, '517, and '105 teach the limitations of claim 84. '710 discloses the claimed invention as discussed above except for the elements of battery of the second sub-unit are in a commercial 18650 size. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have chosen the elements of battery of the second sub-unit are in a commercial 18650 size, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Claim 107, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein the at least one electric or electronic module comprises a single control module composed of at least one electronic board with at least one digital processing unit (e.g., 8, 38, see Fig. 1, 14) associated with a memory 9e.g., the memory store the data and the firmware, see Fig. 8-10) and at least one of annexed digital circuits and analog circuits 9e.g., see the circuits in Fig. 3A, 4A, 5, 15).

Claim 108, '710, '517, and '105 teach the limitations of claim 107. '710 further teaches that wherein the at least one digital processing unit comprises at least one of a microprocessor, a microcontroller, and a digital signal processor (e.g., the MCU 8, 38, see Fig. 1, 14).

Claim 109, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that

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wherein the battery comprises an association of a series of cells (e.g., see the battery cells in Fig. 1), and wherein the at least one electric or electronic module at least one of manages a charging (e.g., see Fig. 8), manages a discharging (e.g., see Fig. 9), balances a charging of each cell of the battery, evaluates and displays a capacity of the battery, protects the battery during a discharging against excess current when the tool is being used, manages the tool during storing phases, manages alarms, manages information, transmits information collected, and manages diagnostics.

Claim 110, '710, '517, and '105 teach the limitations of claim 109. '710 further teaches that

wherein the at least one electric or electronic module is structured and arranged to constantly exploit voltage measuring values of each cell of the battery in performing at least one of the managing of the charging (e.g., see step 21 in Fig. 8), the managing of the discharging (e.g., see step 31 in Fig. 9), the balancing of the charging of each cell, and the evaluating and the displaying of the capacity of the battery.

Claim 111, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that

wherein the battery further comprises n serially associated cells (e.g., see the battery cells in Fig. 1) and the at least one electric or electronic module comprises a digital processing unit (e.g., 8, Fig. 1) having an input analog/digital converter (e.g., 21, Fig. 3A, 4A, 5), and the electric tool set further comprises:

an acquisition electronic chain comprising identical n analog modules mounted at terminals of the n cells to measure voltage values for each cell (e.g., see Fig. 3B, 6); at

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least one analog multiplexer (e.g., 2, Fig. 1-2, 5); and an adapted circuit (e.g., see the circuit between battery cells and A/D converter 21 in Fig. 3A, 4A, 5), wherein the voltage values measured by the n analog modules are directed, one after the other (e.g., see Fig. 3B, 6), by the at least one analog multiplexer toward the input analog/digital converter after amplification by the adapted circuit (e.g., by the OP AMP, see Fig. Fig. 3A, 4A, 5).

Claim 118, '710, '517, and '105 teach the limitations of claim 111. '710 further teaches that dissipating circuits including electronic switchers (e.g., see the switches in Fig. 1, 2, 14) associated with resistive elements, wherein a balancing of the charging of the cells with respect to one another is managed by the digital processing unit controlling a change in a charging current with the dissipating circuits (e.g., see col. 16, lines 17-27).

Claim 119, '710, '517, and '105 teach the limitations of claim 111. '710 further teaches that a discharge switching component (e.g., SW1, Fig. 1); and a sound or visual warning signal (e.g., see col. 2, lines 10-12; col. 15, lines 19-23, Fig. 20), wherein managing a discharging comprises:

constantly checking voltage measuring values of each cell (e.g., S31, Fig. 9) by the digital processing unit; interrupting the discharging when the digital processing unit detects that one of the voltages measuring values of a cell has reached a minimum discharge threshold (e.g., S33, S34); and

cutting off the discharging by deactivating the discharge switching component, resulting in the tool being stopped (i.e., it's the inherent result of the disconnecting the

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current supply from the battery to the load), and by activating the sound or visual warning signal (e.g., see col. 2, lines 10-12; col. 15, lines 19-23, Fig. 20).

'710, '517, and '105 do not explicitly disclose the minimum discharge threshold is recommended by the manufacturer of the battery. However, it would have been obvious to one of ordinary in art at the time of invention have used the minimum discharge threshold recommended or required by the manufacturer of the battery since the manufacturer of the battery have the best knowledge of the perimeters for using their battery. Therefore, the subject matter as whole would have been obvious to one of ordinary in art to have used the minimum discharge threshold recommended or required by the manufacturer of the battery the minimum discharge threshold, since the manufacturer of the battery have the best knowledge of the perimeters for how to use their battery.

Claim 120, '710, '517, and '105 teach the limitations of claim 111. '710 further teaches that an analog electronic circuit (e.g., see the circuit in Fig. 3A, 4A, 5), which measures a charging and discharging current of the battery (e.g., see Fig. 8, 9), wherein managing a charging, evaluating and displaying a capacity of the battery (e.g., see e.g., see col. 2, lines 10-12; col. 15, lines 19-23, Fig. 20) and protecting against excess current during a discharging are continuously managed by the digital processing unit in conjunction with the analog electronic circuit (e.g., see the steps in Fig. 9).

Claim 121, '710, '517, and '105 teach the limitations of claim 120. '710 further teaches that a charge switching component (e.g., SW2, Fig. 1) controlled by the digital

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processing unit, wherein, while the third charger sub-unit is connected to the second sub-unit in an area of an electronic board (i.e., a board holding the electronic components of the charging and measurement/detecting circuits is implicitly taught) of the electric or electronic module controlling the battery (e.g., see Fig. 8), during the managing of the charging, an end of the charging is obtained by opening the charge switching component when, by the analog electronic circuit measuring the charging and discharging current (e.g., see S24 in Fig. 8), the digital processing unit at least one of: detects a drop in the charging current for the battery down to a recommended threshold (e.g., see S23 in Fig. 8), detects a temperature of the battery exceeding an authorized limiting value; and detects the charging continuing for a period of time that is greater than a given fraction of a theoretical charge time.

Claim 122, '710, '517, and '105 teach the limitations of claim 121. '710, '517, and '105 do not explicitly disclose wherein the recommended threshold is about 50 mA.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use the 50 ma as the threshold, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)

Claim 123, '710, '517, and '105 teach the limitations of claim 121. '710, '517, and '105 do not explicitly disclose wherein the authorized limiting value is about 45 °C.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the authorized limiting value being about 45 °C, since

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it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)

Claim 124, '710, '517, and '105 teach the limitations of claim 121. '710, '517, and '105 do not explicitly disclose wherein the given fraction of the theoretical charge time is about 20%.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the given fraction of the theoretical charge time being about 20%, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)

Claim 125, '710, '517, and '105 teach the limitations of claim 121. '710 further teaches that wherein the digital processing unit manages the evaluating and the displaying the capacity of the battery during the charging and during use of the tool by calculating the capacity by constantly accounting for capacity information related to: an instantaneous charging and discharging current of the battery determined by the analog electronic circuit; and the voltage measuring values of each cell (e.g., see Fig. 6, 8, 9, S41 in Fig. 10, S51 in Fig. 12).

Claim 126, '710, '517, and '105 teach the limitations of claim 125. '710 further teaches that wherein the capacity information is further related to an average internal resistance of each cell (e.g., the ratio of the cell voltage and current, see col. 18, lines 45-49).

Claim 139, '710, '517, and '105 teach the limitations of claim 107. '710 further teaches wherein the first sub- unit further comprises an electric actuator module (e.g., SW2, Fig. 1) for controlling the electric actuator, and wherein the control module is associated with the electric actuator module on the electronic board, with both the control module and the electric actuator module using a same digital processing unit (e.g., 8, Fig. 1) of the at least one digital processing unit (e.g., see Fig. 1).

Claim 140, '710, '517, and '105 teach the limitations of claim 111. '710 further teaches that a charge switching component, wherein the at least one electric or electronic module further comprises a control module, which comprises, for each cell, safety redundant circuits (e.g., 34, 35, 52, Fig. 15) for stopping a charging (e.g., see col. 11 line 59-col. 12 line 25, and col. 12, lines 49-60), and

wherein, in a case of a voltage overload of a Cell, each safety redundant circuit is individually capable of controlling a general interruption of the charging by directly deactivating the charge switching component without biasing the at least one digital processing unit (e.g., see col. 12, lines 49-60, Fig. 14, 15).

Claim 141, '710, '517, and '105 teach the limitations of claim 120. '710 further teaches that wherein the control module further comprises a discharge stopping redundant circuit (e.g., 34, 35, 52, Fig. 15),

wherein if the analog electronic circuit detects a discharging current equal to or greater than a maximum value allowed for the battery, the discharge stopping

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redundant circuit interrupts the discharging by directly deactivating the discharge switching component without biasing the digital processing unit (e.g., see col. 12, lines 26-53, 54-60, Fig. 14, 15).

Claim 142, '710, '517, and '105 teach the limitations of claim 84. '710 further teaches that wherein the third charger sub-unit further comprises a special circuit for regulating voltage and current (e.g., voltage and current to each battery cells being regulated and controlled, see Fig. 8, 16), wherein the special circuit generates a voltage and a controlled current (e.g., voltage and current to each battery cells, see Fig. 8, 16).

'710, '517, and '105 do not explicitly disclose that the voltage generated by the special circuit with a precision approximating 0.5%. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modified the power tool set of '710 and 517 to generate the voltage by the special circuit with a precision approximating 0.5%, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)

Claim 143, '710, '517, and '105 teach the limitations of claim 84. '710 does not explicitly disclose that at least one of specific protective casings and specific gripping casings for each of the first sub-unit, second sub-unit and third charging sub-unit, in which each of the first sub-unit, second sub-unit and third charging sub-units are respectively mounted. '517 further disclose that at least one of specific protective casings and specific gripping casings for each of the first sub-unit (e.g., the case of 70,

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see Fig. 3), second sub-unit (e.g., the case of 50, see Fig. 2) and third charging sub-unit (e.g., the case of 10, see Fig. 1), in which each of the first sub-unit, second sub-unit and third charging sub-units are respectively mounted. Therefore, it would have been obvious to one of ordinary skill in art at the time of invention to have modified the power tool set of '710, '517, and '105 to include the cases for each sub-unit, as disclosed in '517, since it protects the internal parts of each sub-unit.

5. Claims 86-87, 91-93 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koga (US Patent No. 6268710, hereinafter '710) in view of Sakakibara (US Patent No. 6433517, hereinafter '517), further in view of Iwaizono (US Patent No. 6577105, hereinafter '105), and further in view of Pfeifer et al, (US Patent No. 6087815, hereinafter '7815).

Claims 86-87, 91-93, '710, '517, and '105 teach the limitations of claim 84 as discussed above. '710, '517, and '105 do not explicitly disclose that a first flexible disconnectable electrical cord, wherein the first sub-unit is electrically disconnectably connectable to the second sub-unit by the first flexible disconnectable electrical cord, and the first flexible disconnectable electrical cord comprises a second connector couplable to the second sub-unit. '7815 discloses a portable power tool system using a flexible cable 46 with corresponding mating connectors to connect the power tool 40 to its power source 44 (e.g., see Fig. 2) to make the needed electrical connections.

Therefore, it would have been obvious to one of ordinary skill in art at the time of invention to have modified the power tool set to include a flexible cable with

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corresponding connectors in the power tool system of '517, since it makes the sub-units of the systems connectable (e.g., see Fig. 2).

6. Claim 90 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koga (US Patent No. 6268710, hereinafter '710) in view of Sakakibara (US Patent No. 6433517, hereinafter '517), further in view of Iwaizono (US Patent No. 6577105, hereinafter '105), and further in view of Takano et al. (US PG Pub. No. 20030096158, hereinafter '158).

Claim 90, '710, '517, and '105 teach the claimed invention except for explicitly disclosing that the tool is one of pruning scissors, a saw, a fruit picking tool, a lawnmower, a bush cutter, a hedge cutter, an impact spanner and a pneumatic hammer.

'158 teaches the limitations of claim 84 as discussed above. It further teaches that wherein the tool is one of pruning scissors, a saw (e.g., see Fig. 17), a fruit picking tool, a lawnmower, a bush cutter, a hedge cutter, an impact spanner and a pneumatic hammer (e.g., see [0071]-[0073], [0075][0078], [0092-0093], Fig. 4-5). It would have been obvious to one of ordinary skill in art at the time of invention to have modified the power tool set to include a saw as the tool, since it provides cutting ability.

7. Claims 112-116, 117 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koga (US Patent No. 6268710, hereinafter '710) in view of Sakakibara (US Patent No. 6433517, hereinafter '517), and further in view of Rouillard et al, (US Patent No. 5808469, hereinafter '469).

Claim 112, '710, '517, and '105 teach the limitations of claim 111 as discussed above.

'710, '517, and '105 do not disclose that a differential electronic circuit with an operational amplifier, using one of resistances and input resistive elements, being arranged to subtract a voltage measured at a negative terminal of a cell from a voltage measurement of a positive terminal of the cell.

'469 further teaches battery monitoring circuit (e.g., 80, Fig. 2) having a differential electronic circuit with an operational amplifier (e.g., 112, Fig. 2), using one of resistances and input resistive elements (e.g., 100), being arranged to subtract a voltage measured at a negative terminal of a cell from a voltage measurement of a positive terminal of the cell (e.g., see Fig. 2).

Therefore, it would have been obvious to one of ordinary in art at the time of invention to have modified the power tool set to include the differential electronic circuit with an operational amplifier, using one of resistances and input resistive elements, being arranged to subtract a voltage measured at a negative terminal of a cell from a voltage measurement of a positive terminal of the cell, as disclosed in '469 since it is a suitable method in order to have measured the battery voltage of each cell.

Claims 113-115, '710, '517, '105, and '469 teach the claimed invention except for explicitly disclosing wherein the one of resistances and input resistive elements have an impedance greater than or about 1 Mohm, to obtain very low leakage currents, wherein the leakage currents are less than 1/20000th per hour of a total capacity of the battery, or wherein the voltage measuring values of each cell are delivered with a measuring

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precision of at least 50 mV. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the one of resistances and input resistive elements have an impedance greater than or about 1 Mohm, to obtain very low leakage currents, the leakage currents are less than 1/20000th per hour of a total capacity of the battery, and the voltage measuring values of each cell are delivered with a measuring precision of at least 50 mV., since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

For claims 116-117, '710, '517, '105, and 469 teach the claimed limitations of claim 115 as discussed above. As regarding to the limitations " ... being obtained by calibration during a manufacture of an electronic board of the at least one electric or electronic module", and "wherein the calibration includes: substituting at least one very precise reference voltage for the measured voltages at the terminals of each cell; and programmatically inputting error correcting parameters in the digital processing unit, for each voltage measuring module, as a function of a measurement of the at least one very precise reference voltage", even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

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8. Claims 98-100 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koga (US Patent No. 6268710, hereinafter '710) in view of Sakakibara (US Patent No. 6433517, hereinafter '517), further in view of Iwaizono (US Patent No. 6577105, hereinafter '105), and further in view of Chamberlain et al, (US Patent No. 5466545, hereinafter '545).

Claim 98, '710, '517, and '105 teach the limitations of claim 84. '710, '517, and '105 do not disclose one module of the at least one electric or electronic modules protects the battery against short circuits.

'545 disclose a battery module (e.g., see Fig. 8) with short circuit protection (e.g., see fuse 92, circuit breaker 94, Fig. 8). Therefore, it would have been obvious to one of ordinary skill in art at the time of invention to have modified the power tool set to include a fuse or a circuit breaker in the third sub-unit, since it provides short circuit protection to the battery (e.g., see Fig. 8).

Claim 99, '710, '517, '105, and '545 teach the limitations of claim 98 as discussed above. '710, '517, and '105 do not disclose that wherein the one module of the at least one electric or electronic modules comprises a fuse arranged at least at one of the terminals of the battery to protect the battery against the short circuits. '545 disclose a battery module (e.g., see Fig. 8) with short circuit protection (e.g., see fuse 92, Fig. 8). Therefore, it would have been obvious to one of ordinary skill in art at the time of invention to have modified the power tool set to include a fuse arranged at least at one of the terminals of the battery, since it provides short circuit protection to the battery (e.g., see Fig. 8).

Claim 100, '710, '517, '105, and '545 teach the limitations of claim 98 as discussed above. '710, '517, '107 do not disclose that wherein the one module of the at least one electric or electronic modules comprises a circuit breaker arranged at least at one of the terminals of the battery to protect the battery against the short circuits. '545 disclose a battery module (e.g., see Fig. 8) with short circuit protection (e.g., see circuit breaker 94, Fig. 8). Therefore, it would have been obvious to one of ordinary skill in art at the time of invention to have modified the power tool set to include a circuit breaker arranged at least at one of the terminals of the battery, since it provides short circuit protection to the battery (e.g., see Fig. 8).

9. Claims 135-137 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koga (US Patent No. 6268710, hereinafter '710) in view of Sakakibara (US Patent No. 6433517, hereinafter '517), further in view of Iwaizono (US Patent No. 6577105, hereinafter '105), and further in view of Smith et al, (US Patent No. 6218806, hereinafter '806).

Claim 135, '710, '517, '105 disclose the claimed invention except for having a separate operating terminal; and at least one of a wire connection, a radio frequency connection, and an infrared connection to the separate operating terminal, wherein the managing of information and the managing of diagnostics comprises storing information acquired during use of the tool in the digital processing unit memory, the information being transmittable by the at least one of the wire connection, the radiofrequency connection, and the infrared connection to the separate operating terminal.

'806 discloses a power tool set (e.g., see Abstract; Fig. 1-4) having a digital processing unit memory (e.g., 44, Fig. 3); a separate operating terminal (e.g., 56, 57, 58, Fig. 4); and at least one of a wire connection, a radio frequency connection, and an infrared connection to the separate operating terminal(e.g., see Fig. 4), wherein the managing of information and the managing of diagnostics comprises storing information acquired during use of the tool in the digital processing unit memory (e.g., see Abstract), the information being transmittable by the at least one of the wire connection, the radiofrequency connection, and the infrared connection to the separate operating terminal (e.g., see Fig. 4). Therefore, it would have been obvious to one of ordinary skill in art at the time of invention to modify the electric tool set to further include a separate operating terminal; and at least one of a wire connection, a radio frequency connection, and an infrared connection to the separate operating terminal, wherein the managing of information and the managing of diagnostics comprises storing information acquired during use of the tool in the digital processing unit memory, the information being transmittable by the at least one of the wire connection, the radiofrequency connection, and the infrared connection to the separate operating terminal, as disclosed in '806, since the information of the electric tool set can be downloaded and managed in the computer (e.g., 53, see Fig. 4)

Claim 136, '710, '517, '105, and '806 teach the limitations of claim 135 as discussed above. '710, '517, '105 do not disclose that wherein the information acquired includes at least one of a number of recharges, a computation of a number of hours the

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tool was used, a change in the capacity of the battery in time, and an average energy consumed by the tool.

'806 further discloses that that wherein the information acquired includes at least one of a number of recharges (e.g., see col. 2, lines 46-58), a computation of a number of hours the tool was used, a change in the capacity of the battery in time, and an average energy consumed by the tool.

Therefore, it would have been obvious to one of ordinary skill in art at the time of invention to modify the electric tool set to further make the information acquired includes at least one of a number of recharges (e.g., see col. 2, lines 46-58), a computation of a number of hours the tool was used, a change in the capacity of the battery in time, and an average energy consumed by the tool., as disclosed in '806, since the these information can be downloaded and managed in the computer (e.g., 53, see Fig. 4)

Claim 137, '710, '517, '105, and '806 teach the limitations of claim 135 as discussed above. '710, '517, '105, do not disclose that wherein the separate operating terminal is at least one of a personal computer (e.g., 53, Fig. 4), an electronic personal assistant, and a GSM.

'806 further teaches that wherein the separate operating terminal is at least one of a personal computer (e.g., 53, Fig. 4), an electronic personal assistant, and a GSM.

'806 reads the same obviousness as discussed in claim 135 rejection above.

10. Claims 138 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koga (US Patent No. 6268710, hereinafter '710) in view of Sakakibara (US Patent No. 6433517, hereinafter '517), further in view of Smith et al, (US Patent No. 6218806,

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hereinafter '806), and further in view of Smith et al, (US PG Pub No. 20040027094, hereinafter '094)

11. Claim 138, '710, '517, '105, and '806 teach the invention except for explicitly disclosing wherein the separate operating terminal is connectable to the Internet.

'094 discloses a battery information management system with separate operating terminal being connectable to the Internet (e.g., see Fig. 1). Therefore, it would have been obvious to one of ordinary in art at the time of invention to have modified the separate operating terminal is connectable to the Internet, as disclosed in '094, since it can access the information remotely (e.g., see [0019]).

Allowable Subject Matter

12. Claims 127-134 are allowed.

13. The following is a statement of reasons for the indication of allowable subject matters:

For claim 127-134, please see previous office action sent on 10/6/2010 for Examiner's statement of reasons for the indication of allowable subject matters.

Response to the Arguments

Applicant's arguments in the Remarks filed on 10/22/2010 have been considered but are moot in view of the new ground of rejection.

Examiner's Note:

14. Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific

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limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

15. In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUE ZHANG whose telephone number is (571)270-1263. The examiner can normally be reached on M-Th 7:30-5:00PM EST, Other F 7:30AM-5:00PM EST

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Monica Lewis can be reached on 571-272-1838. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Monica Lewis/
Supervisory Patent Examiner, Art Unit 2838

JZ